



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/676,470

10/01/2003

Akio Yamamoto

IIW-033

7531

959 7590 12/22/2006  
LAHIVE & COCKFIELD, LLP  
ONE POST OFFICE SQUARE  
BOSTON, MA 02109-2127

EXAMINER

ECHELMEYER, ALIX ELIZABETH

ART UNIT

PAPER NUMBER

1745

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

12/22/2006

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/676,470

Applicant(s)

YAMAMOTO ET AL.

Examiner

Alix Elizabeth Echelmeyer

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is in response to Applicants' amendment filed October 5, 2006. Claim 1 has been amended. Claims 1-6 are pending and are rejected finally for the reasons given below.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Formanski et al. (US Pre-Grant Publication 2002/0142200) in view of Feucht et al. (US Patent Number 6,237,336).

Formanski et al. teach that, for safety reasons, hydrogen emissions from a fuel cell system should be avoided ([0006]). Formanski et al. further teach that a fuel cell system can be improved with regard to cost, weight, and volume by providing two hydrogen exhaust lines that lead to an exhaust mixing device wherein hydrogen exhaust is mixed with cathode exhaust and released when the hydrogen component is below the ignition limit (Figure 6; [0031]).

Formanski et al. fail to teach any structure regarding the mixing device.

Art Unit: 1745

Feucht et al. teach a mixing chamber for the exhaust gases of a combustion engine (Figure 3; column 3 lines 63-67; column 4 lines 1-55). The chamber has two inlets for two different exhaust gases. One inlet leads to the larger chamber, while the other inlet is into a pipe that goes through the chamber (Figure 3). The pipe contains a plurality of radially extending holes, ensuring adequate mixing of the two exhaust gases (column 4 lines 29-32).

Regarding claim 1, it would be desirable to use the mixing chamber of Feucht et al. in the fuel cell system of Formanski et al. in order to ensure adequate mixing of the exhaust gases so that the hydrogen component of the exhaust is below the ignition limit.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the mixing chamber of Feucht et al. in the fuel cell system of Formanski et al. to ensure that adequate mixing of the exhaust gases occurs so that the hydrogen component of the exhaust is below the ignition limit.

Regarding claim 2, Feucht et al. teaches that the pipe contains a plurality of radially extending holes (column 4 lines 29-32).

As for claim 3, it can be seen in Figure 3 of Feucht et al. that the pipe included in the mixing chamber has a bent portion. Further, the radially extending holes by nature would also occur on the lower portion of the bent portion. The holes could be used in the intended use of the instant application to drain water from the exhaust traveling through the pipe.

As for claim 4, Formanski et al. in view of Feucht et al. disclose the claimed invention except for the smaller cross-sectional area in one portion of the pipe. It would

Art Unit: 1745

have been an obvious matter of design choice to make one cross-sectional area of the pipe smaller than another, since a modification would have involved a mere change in the size of the component. A change in size is generally recognized as being within the level of ordinary skill in the art. MPEP 2144.04 (IV)

Regarding claim 5, the bottom of the mixing chamber as seen in Figure 3 of Feucht et al. can provide a collector for condensed water that may be drained using the holes as taught in claim 3.

With regard to claim 6, Formanski et al. teach two hydrogen exhaust lines ([0031]).

### ***Response to Arguments***

4. Applicant's arguments filed October 5, 2006 have been fully considered but they are not persuasive.

Applicants argue that Feucht et al. do not teach a reservoir. The examiner disagrees. The exhaust gas that is fed through an inlet into the mixing chamber of Feucht et al. is stored there while it is being mixed with air. The instant application as claimed does not provide a definition for "storing" that distinguishes the apparatus of the instant invention from that of Feucht et al.

Next, applicants argue that the mixing chamber of Feucht et al. is not configured to dilute an exhaust gas stored in a reservoir to be discharged. Feucht et al. teach that an exhaust gas is mixed with air – it is in this step that the gas is diluted – and then removed to a combustion chamber – it is discharged from the mixing chamber.

It seems that Applicants are implicitly arguing that the discharging of the mixed exhaust and air taught by Feucht et al. differs from the discharging in the invention. However, Applicants are not claiming that the discharge from the cathode exhaust pipe cannot be recirculated.

The 103 rejection above is taking the concept taught by Formanski et al., that hydrogen exhaust should be mixed with cathode exhaust and released when the hydrogen component is below the ignition limit, and using the mixing structure taught by Feucht et al. to carry out the mixing suggested but not structurally taught by Formanski et al. It is the teaching of Formanski et al. that the hydrogen exhaust should be diluted with cathode exhaust prior to discharge from the fuel cell system. Feucht et al. teach an apparatus for diluting hydrogen exhaust.

### ***Conclusion***


5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



PATRICK JOSEPH RYAN  
SUPERVISORY PATENT EXAMINER

Alix Elizabeth Echelmeyer  
Examiner  
Art Unit 1745

aee